User Documentation

MYECL™ Imager Manual

Thermo
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Chapter 1 Overview

Thank You and Welcome

Dear Researcher:

We thank you for your investment in our Thermo Scientific MYECL Imager. We have worked to design a highly functional, yet intuitive, imager that will provide you with valuable images and data of high-resolution and quality.

This manual has been written as a concise guide for the start-up, use and customization of your MYECL Imager unit and acquisition software. Detailed sections covering the imager, image acquisition, file management, maintenance and troubleshooting provide comprehensive information. We encourage you to read the entire manual for a full understanding of the imager, but a Quick Start guide is provided if you want to begin using your new imager immediately.

Thermo Scientific products are always at the forefront of scientific instrument design, and we strive to design and produce instruments that can help you achieve your research goals. Your feedback is a valuable tool that we use for future product development, so please contact us if you have any questions, comments or suggestions.

IMPORTANT Review and implement guidelines for proper set-up before installation. Locate the imager away from water, solvents, corrosive materials, strong magnetic fields and vibration sources.

IMPORTANT The imager weighs 65lbs (29.5kg). Please use two people to lift it by grasping the bottom and the handle at the rear of the imager. Using two people, place the imager onto the benchtop given proper space, electrical and environmental requirements. Remove the outer packaging materials.

IMPORTANT Imager use outside of the workflows described in this manual may put the operator at risk of dangerous exposure to electrical shock or radiated emissions. Do not use this instrument for any purposes or in any configurations not described in this manual.

Contacting Us

For technical or service assistance on the MYECL Imager:

- U.S. Customers: 1-800-874-3723
- Fax: 1-800-842-5007

- International Customers: 1-815-968-0747
- Fax: 1-815-968-4736

Technical Support email for U.S. and international customers:
pierce.ts@thermofisher.com

Technical Support email for European customers:
perbio.eurotech@thermofisher.com

For more information about the Thermo Scientific Protein Biology product line, please visit our website: www.thermoscientific.com/pierce

Imager Overview

The MYECL Imager is designed to be a useful tool for the researcher needing intuitive equipment and software with fast imaging capabilities.

Included Accessories

Your imager purchase includes the following accessories (each quantity 1):

Thermo Scientific MYImageAnalysis Software – CD and User Manual
Chemiluminescence exposure screen
White light conversion screen
UV exposure screen
Imaging reference target
Quick start guide
USB memory device
Stylus
Stylus holder
Power cord with C13 connector

Optional items, including additional filters and UV bulbs (365nm), may be added to the above list depending on the items ordered with the imager.

Note Upon receiving your imager, please verify you have received all of the items listed above. Please contact Thermo Scientific Technical Support for assistance.

Functionality

The MYECL Imager provides:

- UV and white light illumination source for imaging of samples
- Detailed images with varying resolution (1×1, 2×2, 3×3, 4×4 and 8×8 binning) of chemiluminescent Western blots and electrophoresis gels
- Low-noise, high-dynamic range CCD camera detection
- Hardware and software optimized for image acquisition
- One-touch image acquisition
- Multiple image acquisition with pre-set and user-defined settings
- Multitasking capability to review captured images while acquiring new images

MYECL Imager Acquisition Software

Each imager arrives loaded with the MYECL Imager Acquisition Software. This manual gives detailed information on using all software functions and modes.

The acquisition software allows you to acquire images using three different modes:

Chemiluminescence (Chemi) mode for image acquisition of self-emitting, chemiluminescent light

Ultraviolet (UV) mode for image acquisition of UV-excited light

Visible (Vis) mode for image acquisition of LED and/or UV-converted white light

MYImageAnalysis™ Software

The MYImageAnalysis Software is supplied with the MYECL Imager as a vital tool for extracting information from your captured images. The analysis software features:

- Indentify lanes and bands automatically
- View and compare up to six images simultaneously
- Open multiple image formats (e.g., .tif, .jpeg, .png, etc.)
- Export images and data reports directly to Microsoft™ Excel™, Word™ and PowerPoint™ software for further analysis and presentations
- Analyze molecular weight – determine the R_f and molecular weight of protein or nucleic acid bands using installed or custom added molecular weight markers
- Edit digital images – image editing tools include contrast adjustment, image rotation, cropping, de-speckling, false color application and text annotation
- Calculate sample purity automatically based on band and lane intensity
- Perform lane profile densitometry
- Quantitate bands or regions relatively or absolutely

Acquired images are saved and exported as .tif files, which can be directly opened in the analysis software.

Chapter 2 Imager

Installation Guidelines

IMPORTANT Review and implement guidelines for proper set-up before installation. Locate the imager away from water, solvents, corrosive materials, strong magnetic fields and vibration sources.

IMPORTANT The imager weighs 65lbs (29.5kg). Use two people to lift it by grasping the bottom and the handle at the rear of the imager. Using two people, place the imager onto the benchtop given proper space, electrical and environmental requirements. Remove the outer and inner packaging materials.

Space Requirements

The imager requires a stable laboratory bench or table capable of supporting 65lbs (29.5kg). Provide a minimum clearance of 3 inches (7.62cm) at the rear of the imager to allow adequate ventilation for camera cooling and access to the power cord and switch. In addition, allow sufficient space to open the front-facing imager door to place sample within the imager. Refer to imager dimensions in Table 2-1.

Table 2-1. Imager dimensions.

Dimensions	Inches	Centimeters
Width	12.25	31.1
Depth	22	55.9
Height	21	53.3

Electrical Requirements

A grounded circuit capable of delivering the appropriate current and voltage is required for installation. Electrical requirements can be located on the imager label on the rear panel of the imager and in Table 2-2. The imager electrical system will adjust to the proper voltage for the respective country (Table 2-3). Connect the imager power cord to the rear left side panel of the system and plug into a grounded power outlet.

Table 2-2. Imager electrical ratings.

Electrical Parameter	Rating
Supply Voltage (VAC)	120-240
Frequency (Hz)	50-60
Power Rating (W)	120
Fuse (power center)	T4AL, 250V, 4A

Table 2-3. Imager electrical requirements for major countries.

Region	Voltage (VAC)	Frequency (Hz)	Amps (A)
US and Canada	120	60	1.0
Europe	220	50	0.5
UK	240	50	0.5
Japan	100	50	1.2
China	220	50	0.5
India	230	50	0.5
South Korea	220	60	0.5

Environmental Requirements

For optimal performance, maintain a constant laboratory temperature range of 15-25°C (59-77°F) with relative humidity between 15-70%. To allow adequate camera cooling, do not place the imager in direct sunlight.

Computer Requirements

The imager is operated by an integrated computer, which is accessed through the touchscreen.

The MYImageAnalysis Software program is included with the imager purchase. To run the MYImageAnalysis Software properly, workstations must meet the minimum performance requirements listed in Table 2-4.

Table 2-4. Recommended computer requirements for MYImageAnalysis Software.

Description	Recommended
Operating System	Windows 7, Vista*, or XP*
Processor	Pentium* 4 @ 2.4GHz
Memory (RAM)	512MB
Hard Drive	2GB
Screen Resolution	1280 × 1024†

† Refer to the MYImageAnalysis Software User Manual for more information.

Imager Images with Feature Locations

Imager Front View

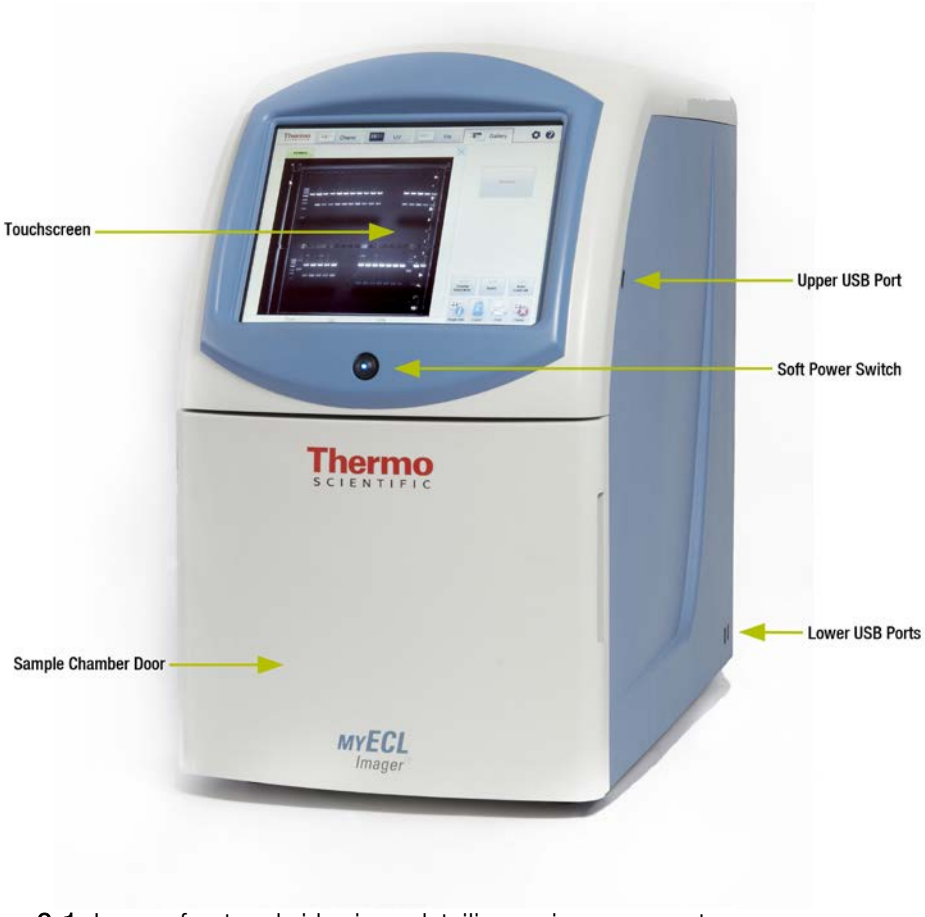


Figure 2-1. Imager front and side views detailing main components.

Imager Front View with Sample Door Open

Figure 2-2. Imager view with the sample door open and the transilluminator extended.

Imager Rear View

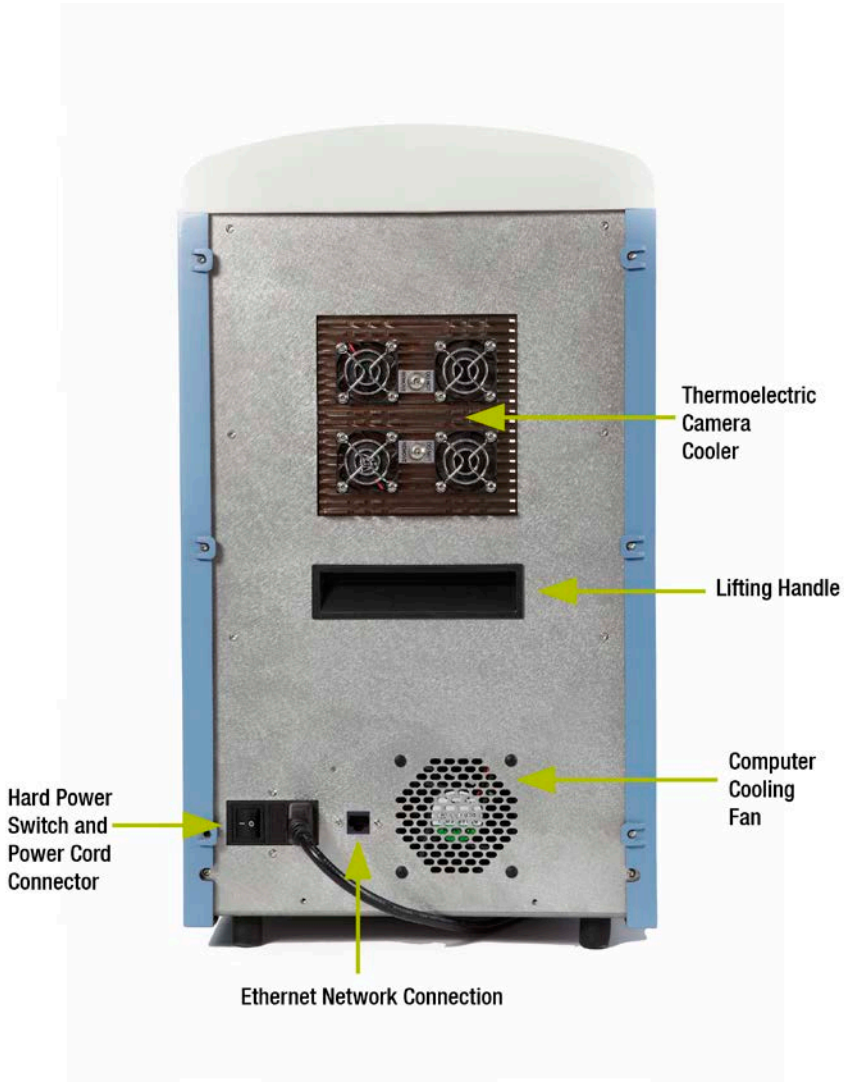


Figure 2-3. Rear imager view.

Start Up

IMPORTANT Allow the imager to equilibrate for 20-30 minutes after each initial hard power up. This ensures that the camera is optimally cooled before image acquisition. Equilibration is not necessary if you have performed a soft shut down of the imager.

Hard Start Up

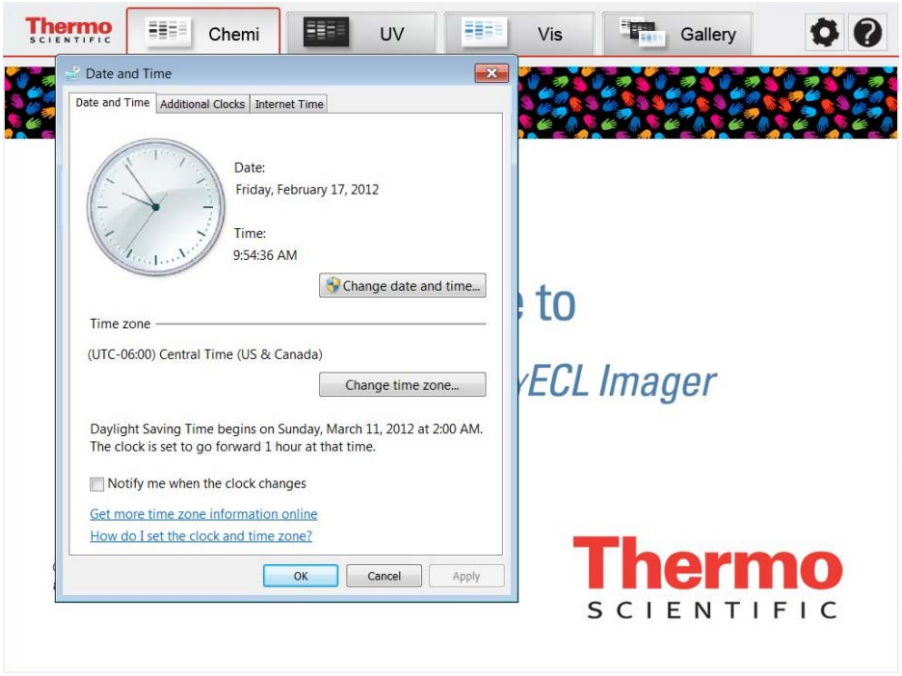
To hard start the imager:

1. Turn on the **hard power switch** located at the bottom of the rear imager panel. The **hard power switch** provides power to all of the imager components.

2. Turn on the **soft power switch** on the front of the imager. This switch activates the internal computer, touchscreen and thermoelectric camera cooler.

3. The computer boots up and the touchcscreen displays an initial message with an **OK** button and the message, "Thank you for selecting the Thermo Scientific MYECL Imager. You are now ready to begin." Touch the **OK** button to continue.

4. You will then be prompted to enter the current date, time and time zone. Upon completion, the screen will automatically move to the default **Chemi** acquire screen.



Soft Start Up

If the imager is powered down with a soft shut down, then a soft start up can be done using the front, soft power switch. The soft power switch is the blue lighted, round rocker switch located just above the front door and below the touchscreen. This switch allows you to power down the imager computer and touchscreen, while maintaining power to the camera cooling unit. This feature allows you to power down the imager, but, once needed, quickly restart the imager without having to wait for the camera temperature to re-equilibrate.

1. Turn on the front soft power switch. The computer restarts and the touchscreen initiates with the default Chemi screen.

2. Begin normal operation of the imager.

Shut Down

Note For extended periods of inactivity, the imager can be hard powered off; however, for typical daily use, optimal camera temperature, and best image quality, avoid hard powering on and off the imager.

Hard Shut Down

Hard shut down is done with the hard power switch on the rear of the imager. This turns off all power to the imager, including the computer and camera cooler.

1. Follow the Soft Shut Down procedure.

2. Turn off the hard power switch at the rear of the imager.

Soft Shut Down

Soft shut down is done using only the front soft power switch.

1. Save any current image analyses.

2. Safely remove any USB flash drives.

3. Turn off the soft power switch.

4. The computer and touchscreen will shut down and turn off. The fans will continue running as needed. The camera cooler will remain powered and continue to maintain the camera at the optimal -25°C.

5. The transilluminator and LEDs turn off.

USB Features

The three external USB ports on the right side of the imager can be used for flash drives, which can be connected through any of the USB ports for easy file management.

Note The Export button always exports files to the E:\ drive, which is automatically the first additional drive connected to the imager. When connecting an external hard drive to the imager, we recommend changing that drive label to a letter other than C, D or E.

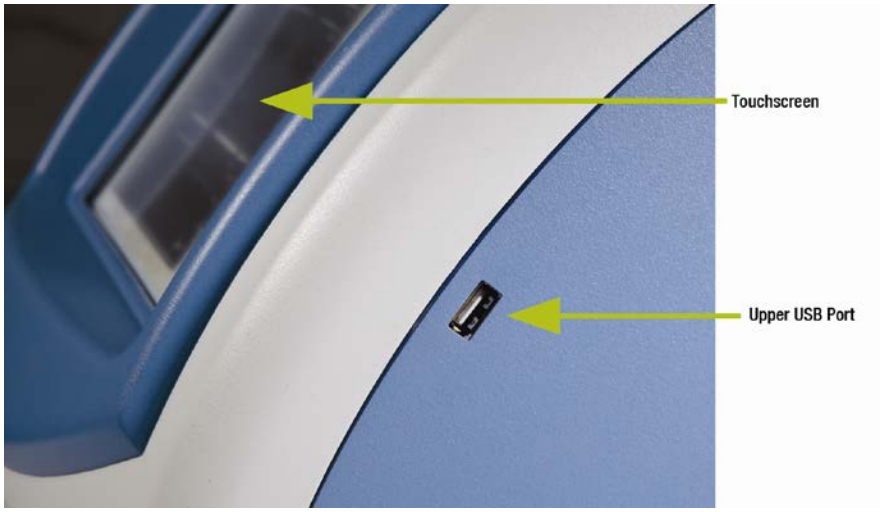


Figure 2-3. Location of upper USB port.

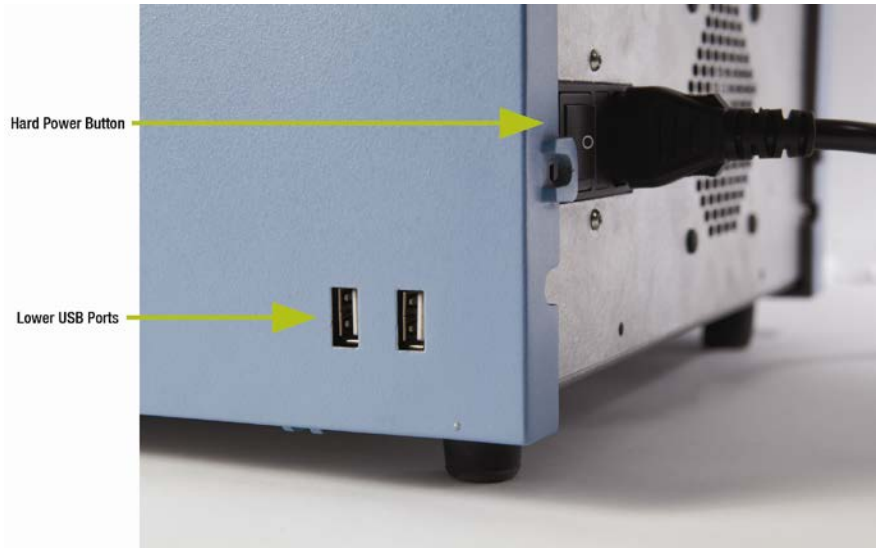


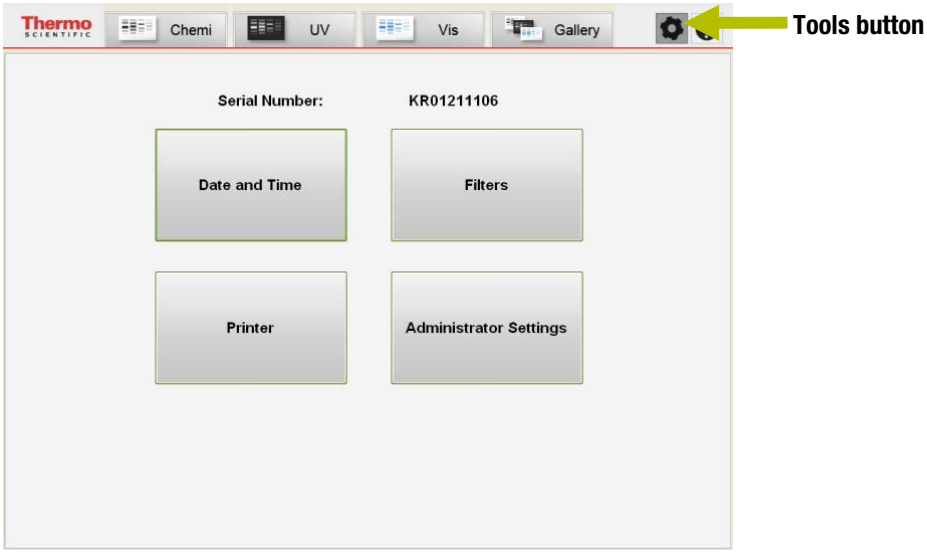
Figure 2-4. Location of lower USB ports.

Imager Settings

The **Tools** button in the top right corner of the acquisition software screen gives you access to basic imager settings and functionality.

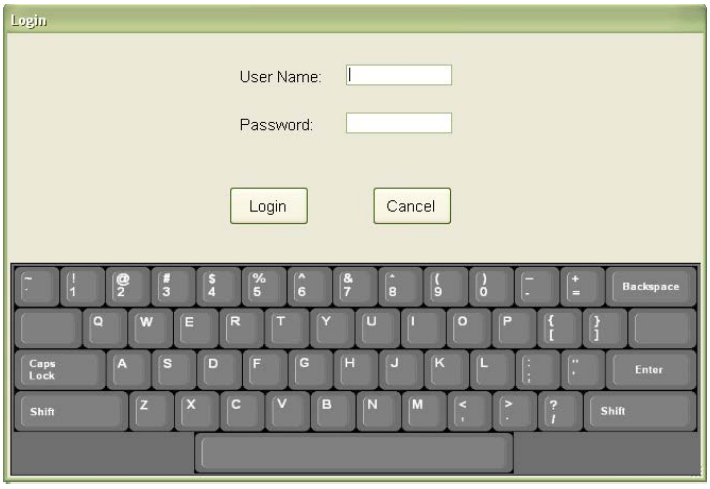
Tools

1. Touch the **Tools** button to bring up the **Tools** screen.



Large buttons for **Date and Time**, **Printer**, **Filters**, and **Administrator Settings** will display on the screen. Select the appropriate button to enter setup for each item.

Note Administrator Settings will open with the following screen requiring a **User Name** and **Password**. Only the designated Administrator at your facility can access this section.



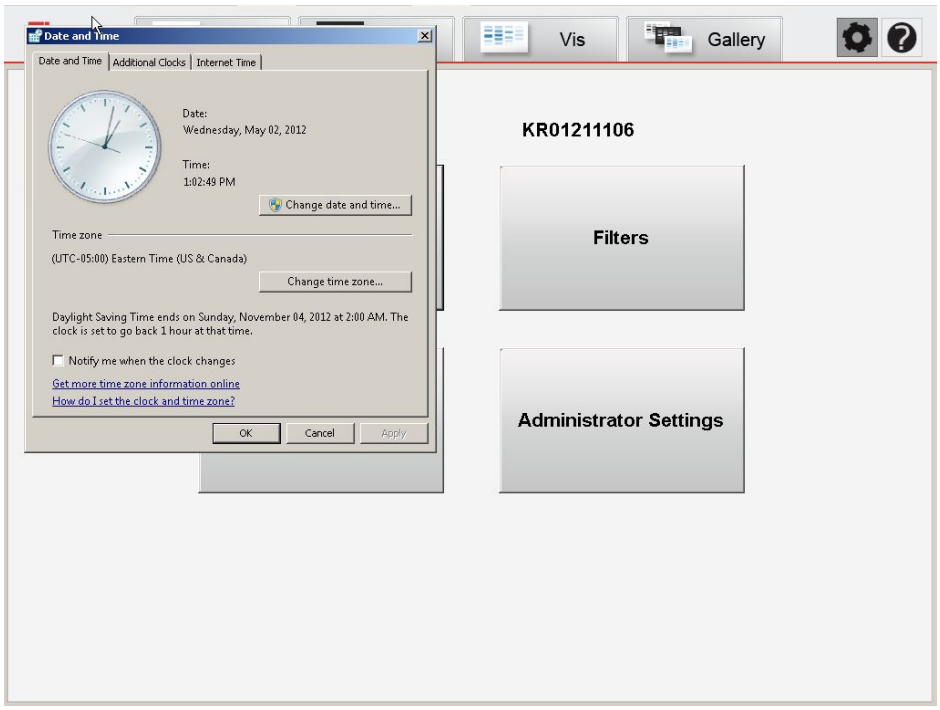
Date and Time

To correct the date, time or time zone:

1. Touch the **Date and Time** button. A Windows clock and calendar will display.

2. Choose the correct settings as needed.

3. Select the **Apply** button, followed by the **OK** button to save the settings.

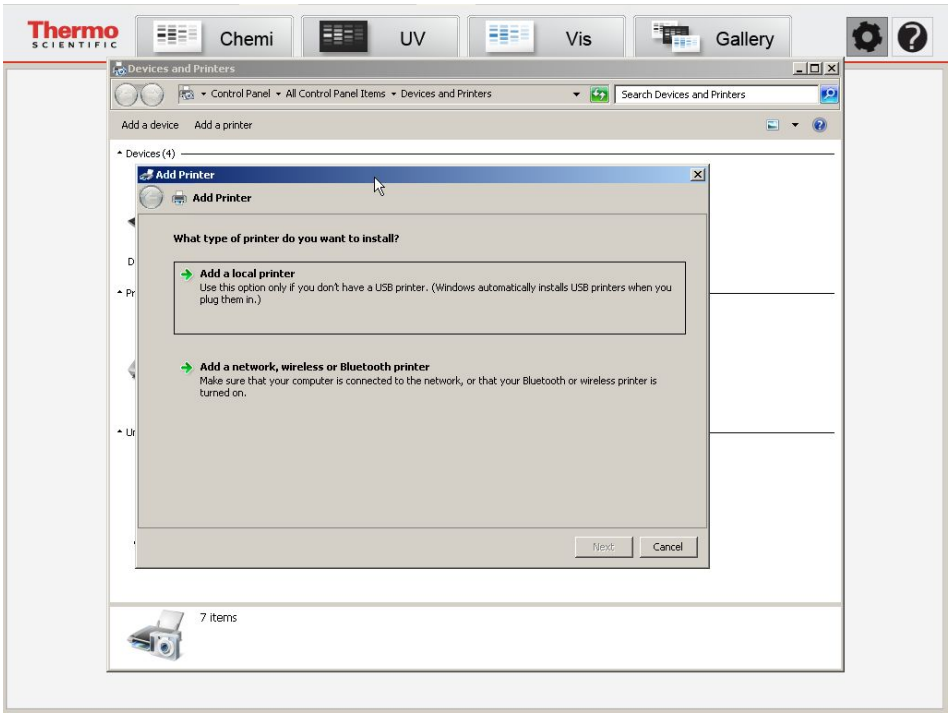


Printer To select a default printer for imager exporting:

1. Touch the **Printer** button. A Printers and Other Devices screen will display.

2. Choose the appropriate printer from the listed selections. Plug-and-play printers will automatically populate the list. Select **Add a Printer** from the left column if the printer is not a local printer or plug-and-play type. A network printer can also be selected as a default printer.

Note Consult your facility's IT department for assistance in setting up network printers.


Thermo SCIENTIFIC
Chemi
UV
Vis
Gallery
Devices and Printers
Control Panel ▸ All Control Panel Items ▸ Devices and Printers
Search Devices and Printers
Add a device
Add a printer
Devices (4)
Add Printer
Add Printer
What type of printer do you want to install?
Add a local printer
Use this option only if you don't have a USB printer. (Windows automatically installs USB printers when you plug them in.)
Add a network, wireless or Bluetooth printer
Make sure that your computer is connected to the network, or that your Bluetooth or wireless printer is turned on.
Next
Cancel
7 items

Filters

The imager has four default filter positions:

Position 1: No filter (for use in **Chemi** applications)

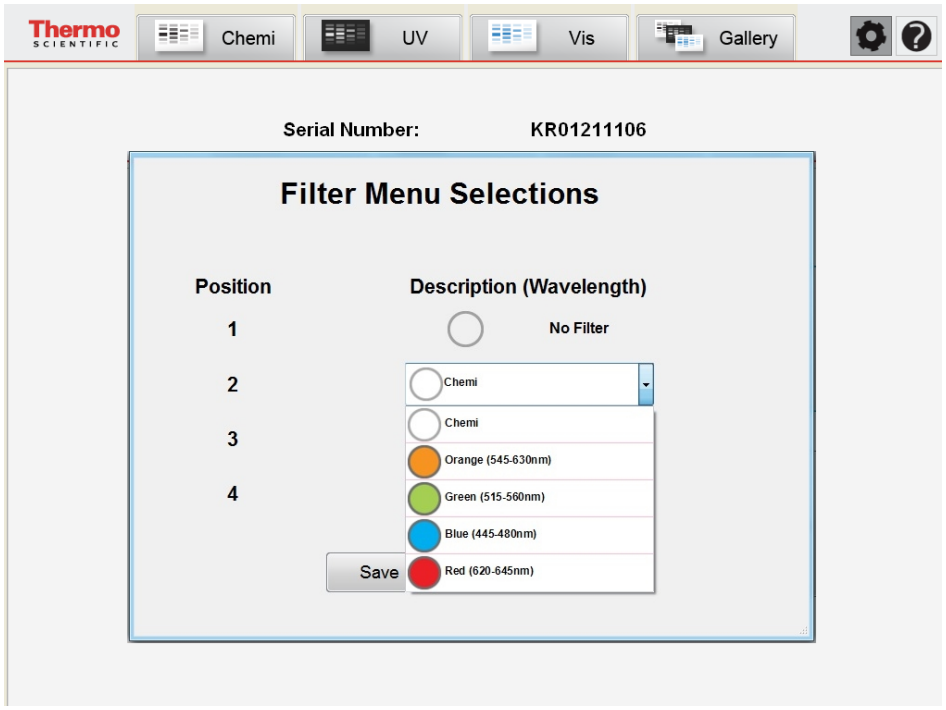
Position 2: Orange filter (for use in **UV** and **Vis** applications)

Position 3: No filter

Position 4: No filter

The imager is supplied with an orange filter for **Position 2**, but green, red and blue filters can also be purchased for additional applications. You can install these filters into **Positions 3 and 4**, depending on your position preference. The **Filter Menu Selections** in **Tools** allow you to assign the filters for each of the **Positions 3 and 4** when different filters are installed.

1. Touch the **Filters** button. The following menu will appear:



2. **Positions 2, 3 and 4** use selectable drop-down menus to enable you to choose between **Empty, Orange, Green, Blue** and **Red**. Select the choice for each filter position.

3. When complete, touch the **Save** button at the bottom of the menu to save the changed defaults.

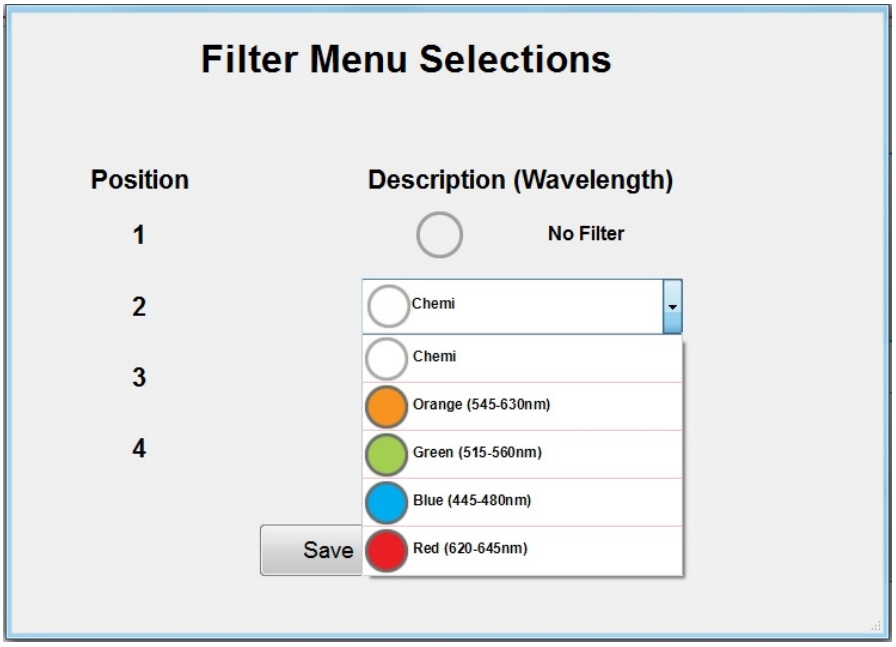


Table 2-4. Imager filter specifications and corresponding dyes.

Filter Color	Wavelength Range (nm)	Compatible Dyes and Stains	Sample Screen
Blue	445-480	DAPI	Clear screen
		AMCA	Clear screen
Green	515-560	SYBR* Green	Clear screen
		SYBR Gold	Clear screen
Orange	545-630	Ethidium Bromide	Clear screen
		Hoechst Blue[§]	Clear screen
		Coomassie Blue	White screen[†]
		Imperial*	White screen[†]
Red	620-645	SYPRO* Ruby	Clear screen
		Deep Purple*	Clear screen

[§] With the MYECL Imager, the orange filter is optimal for Hoechst Blue imaging.

[†] Coomassie Blue and Thermo Scientific Imperial Stains do not require the orange filter; however, these stains require the white light conversion screen. UV and Vis modes use the orange filter in Position 2 by default.

Administrator Settings

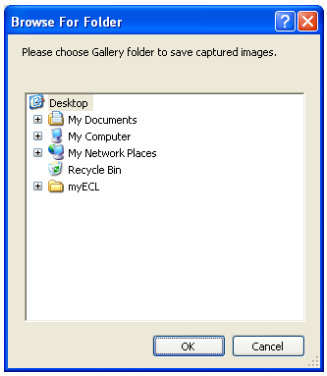
Users will typically not need to access Administrator Settings. Only the facility administrator should have access to these functions through password access. The default user name and password are **myecl** and **1234**, respectively. To avoid improper access, the designated administrator needs to change this username and password once the imager is installed. To change the password, select the **Change User Name and Password** button.

Set Image Gallery Location

The **Set Image Gallery Location** button allows the administrator to set up a default pathway for saving acquired images. The imager has a default image gallery location, "Computer – Local Disk (D:\) – Gallery". The image gallery location can be changed to another gallery folder (Gallery01 – Gallery04) in the Local Disk (D:\) or you can use a network folder.

1. A folder menu will allow for selection of the appropriate location.

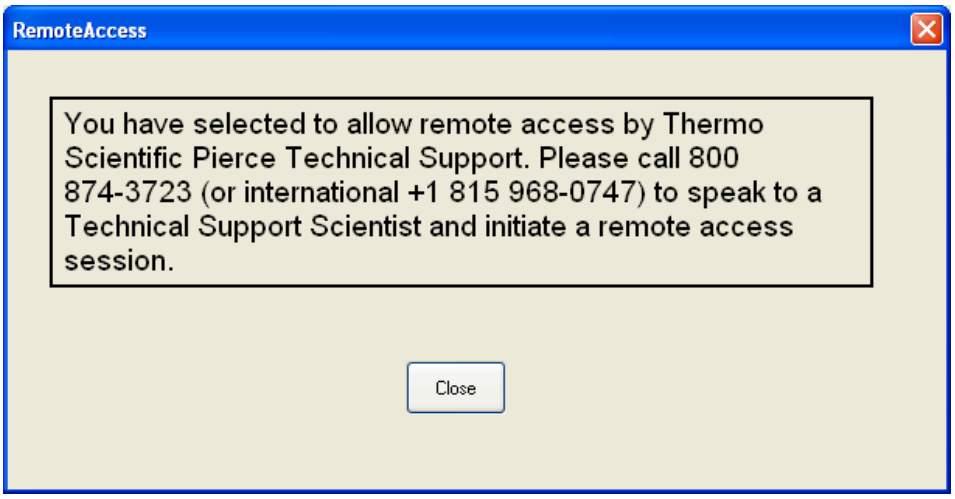
2. Select **OK** after choosing the appropriate storage location.



Note If the Viewing Gallery becomes slow, the administrator can change the image saving location to a different folder to start a new gallery. Previously acquired images will remain in the old gallery folder. The administrator needs to change the image location back to the old folder to access these old images.

Allow Remote Access

Remote access for maintenance and troubleshooting is possible with the imager. After selecting the **Allow Remote Access** button, the administrator views the following screen:


RemoteAccess
You have selected to allow remote access by Thermo Scientific Pierce Technical Support. Please call 800 874-3723 (or international +1 815 968-0747) to speak to a Technical Support Scientist and initiate a remote access session.
Close

Follow the instructions provided and contact our Technical Support team for questions or to troubleshoot the imager.

U.S. contact: 800-874-3723

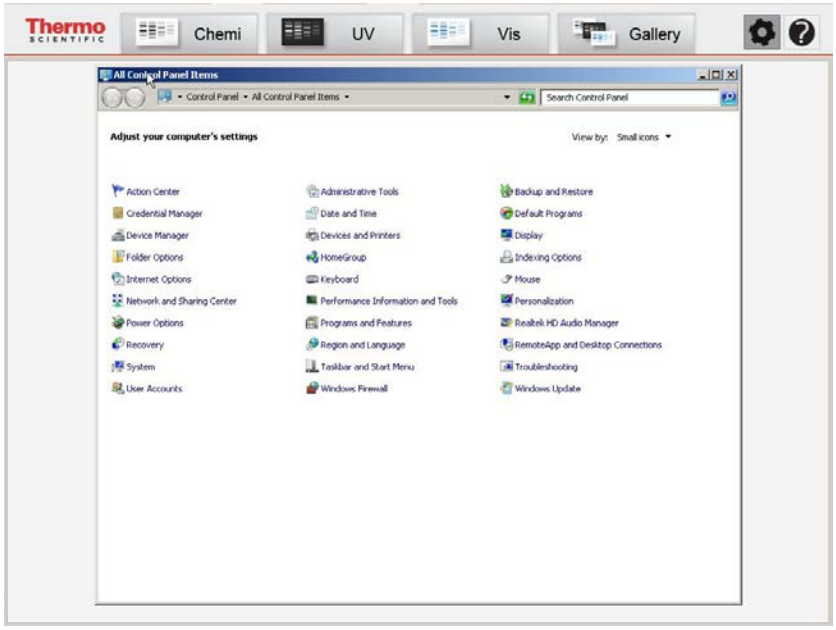
International contact: +1-815-968-0747

Note Remote access requires the imager to be connected to a network with internet access. Contact your facility's IT department regarding correct set up and use of network connections.

Other OS Settings

This function allows the administrator to access the Windows Control Panel to change system and user configurations as needed.

Note Only qualified administrators should have access to this area. Altering configurations can cause imager errors.



Reset Default Focus Position

The default focus position can be reset or changed by selecting the Reset Default Focus Position button. The focus position may need resetting if the current default focus position does not provide in-focus images. The administrator can control this position by going to “Tools” > “Administrator Settings” > “Reset Default Focus Position” and using the slider bar to focus in or out to achieve the required sharpness in Chemi, UV and Vis modes.

Update Software

This function installs and updates the acquisition software when a program update becomes available.

Change Username and Password

This function allows the administrator to change the username and password for accessing the administrator settings.

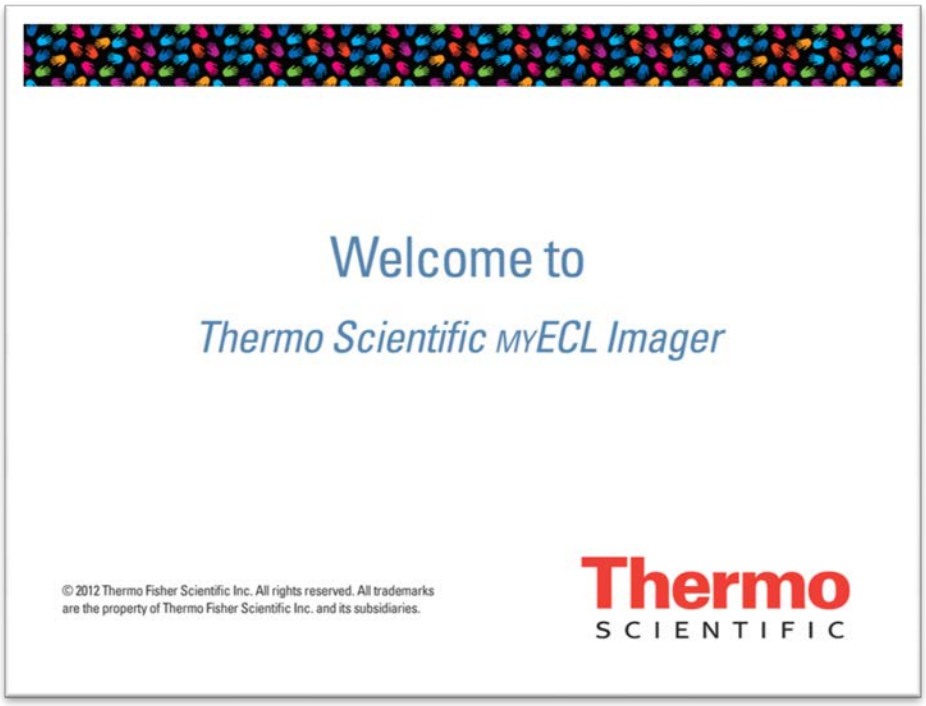
Return

Touching Return will bring the administrator back to the previous Tools menu.

Chapter 3 Image Acquisition

Imager Settings

Upon powering up the imager, the MYECL Imager welcome screen will display.


Welcome to
Thermo Scientific MYECL Imager
© 2012 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries.
Thermo
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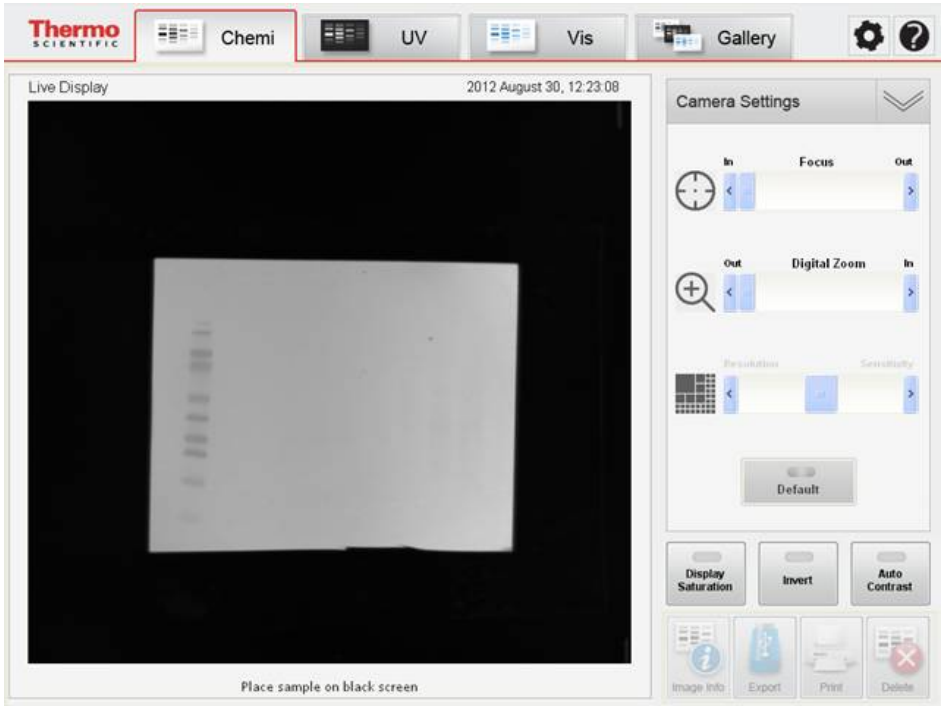
Note If hard powered off, the thermoelectric camera cooler will **NOT** be at the ideal temperature of -25°C. After powering up the imager, please allow 20-30 minutes for the camera to cool to the optimal temperature.

Camera Settings Available in Chemi, UV and Vis Modes



Focus Icon for performing minimal focusing adjustments that may be needed as varying object depths change.

Note An Imaging Reference Target is supplied with the imager. Use this target when performing camera focusing.

Digital Zoom Icon for **increasing or decreasing** the camera zoom and centering the image acquisition area.

Resolution/Sensitivity Icon for adjusting the camera image sensor's degree of response to light; the number of camera pixels used to capture an image.

The **Resolution/Sensitivity** selection allows for choosing among five different sensitivities: 1×1 (far left setting), 2×2, 3×3 (middle, default setting), 4×4 and 8×8 (far right setting) binning. A selection of 1×1 binning provides you with minimum sensitivity/maximum resolution, while a selection of 8×8 binning provides for maximum sensitivity/minimum resolution. Table 3-1 provides multiple specifications related to the varied binning sizes.

Table 3-1. Binning specifications for sensitivity settings.

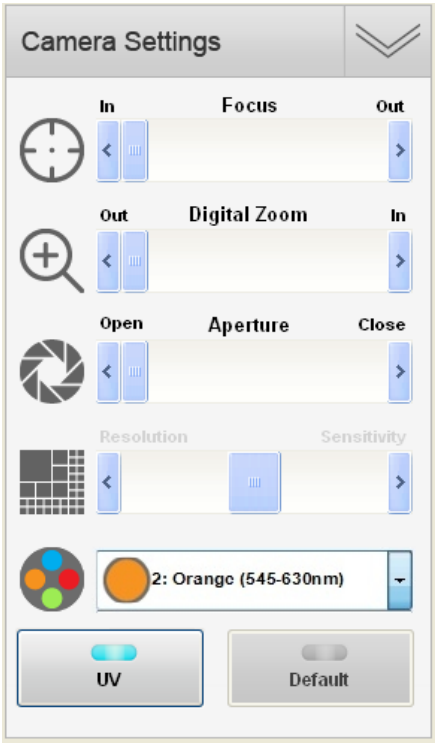
Binning	Size (kb)	DPI (pixels/ inch)	Pixel × Pixel	Image size (inches × inches)	Image size (mm × mm)	Pixel size (µm × µm)
1 × 1	8197	300	2048 × 2048	6.8 × 6.8	173.4 × 173.4	84.7 × 84.7
2 × 2	2050	300	1024 × 1024	3.4 × 3.4	86.7 × 86.7	84.7 × 84.7
3 × 3†	910	300	682 × 682	2.3 × 2.3	57.7 × 57.7	84.7 × 84.7
4 × 4	513	300	512 × 512	1.7 × 1.7	43.3 × 43.3	84.7 × 84.7
8 × 8	129	300	256 × 256	0.9 × 0.9	21.7 × 21.7	84.7 × 84.7

† 3 × 3 binning in 16-bit grayscale .tiff image files are the default settings for the imager.

Default Button used to reset all imager settings to their default values.

Live Image Button used to activate or close the camera's live view of the image area.

Settings Only Available in UV and Vis Modes

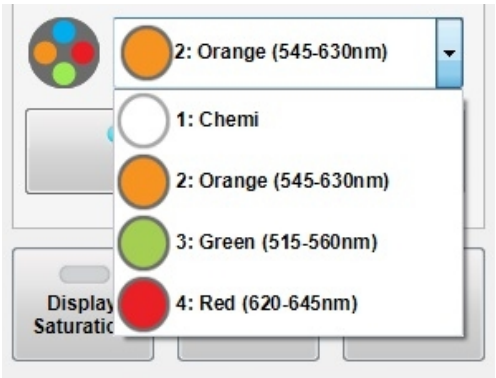


Aperture Slider bar for adjusting the camera lens opening to control sensitivity and depth of field. The aperture can be fully closed (far right position) or fully opened (far left position) depending on the light sensitivity needed.

UV Light Button for turning on/off the transilluminator UV bulbs.

Filter Wheel Position Drop-down menu for moving the filter wheel position to switch filters.

Note Filter Wheel Positions 2-4 can be set for different filter colors by accessing **Tools > Filters.**



Chemiluminescence (Chemi) Mode

Chemiluminescence (Chemi) Mode is the default mode. Chemi mode is used for the capture of sample images using sample-emitted light. These images of the blot are useful for imaging colorimetric molecular weight markers.

Camera Settings

Focus, Digital Zoom and Resolution/Sensitivity camera settings are available in Chemi mode.

Capture Settings

Single Image Acquisition

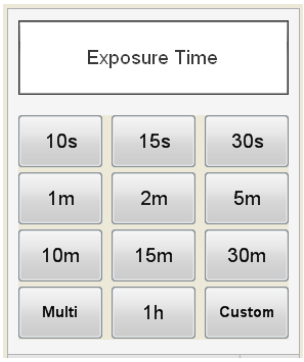
1. Select the Chemi tab on the touchscreen.
2. (Optional) Select the Live Camera button if the live image is not displayed.
3. The white LED lights and live image display are activated. Open the imager door, pull out the transilluminator and install the chemiluminescence exposure screen (black) on the transilluminator glass.
4. Insert and center the sample on top of the chemiluminescence exposure screen (black) using the live image display for reference.
5. Close the imager door.
6. While viewing the live image, adjust the settings for Focus, Digital Zoom and Resolution/Sensitivity in the Camera Settings, if needed.

   Note Camera Settings are available only with the live image display.
7. Select a Pre-set or Custom exposure time.

Note ChemiV images are captured and automatically saved to the Gallery; however, they are not displayed in the image tab if Live Camera is not enabled before image acquisition in Chemi mode. Saved ChemiV images can be displayed in Gallery mode along with the Chemi images.

Pre-set Exposure Time

1. Select one of the pre-set exposure time buttons on the touchscreen keypad. The imager takes an image as soon as the time button is touched.



2. Captured images are displayed on the screen and automatically stored in the **Gallery** for further review and selection.

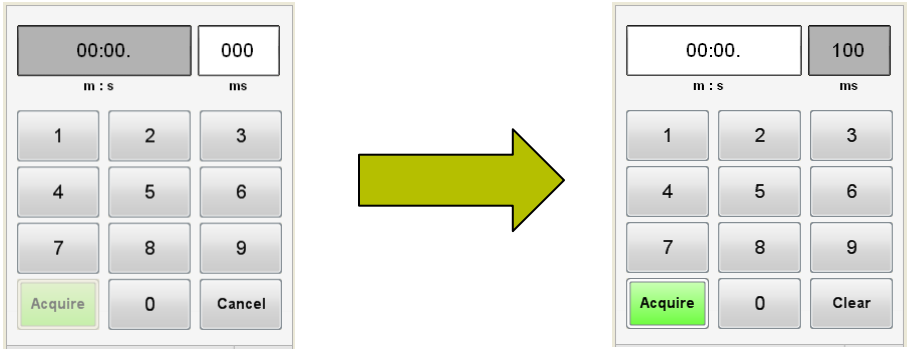
Note A **Stop** button appears over the keypad area once an exposure time button is selected. Image acquisition can be stopped by touching the **Stop** button.

Note Up to six recent images will be displayed on the touchscreen.

Custom Exposure Time

1. Select the **Custom** exposure button using the touchscreen keypad.

2. Enter the desired time in milliseconds (ms), seconds (s) or minutes (m) using the touchscreen keypad numbers. The **m : s** box is used to input seconds and/or minutes and is active by default (box is gray in color). For a custom exposure time of <1 second, select the **ms** box to input milliseconds. The shortest exposure time that can be entered is 10 milliseconds; this appears as "10" in the **ms** box.



3. Once a number is selected, the lower **Cancel** button will become a **Clear** button. Use this to remove any entered numbers.

   Note Selecting the Cancel button will return the custom exposure time keypad to the pre-set exposure time keypad.

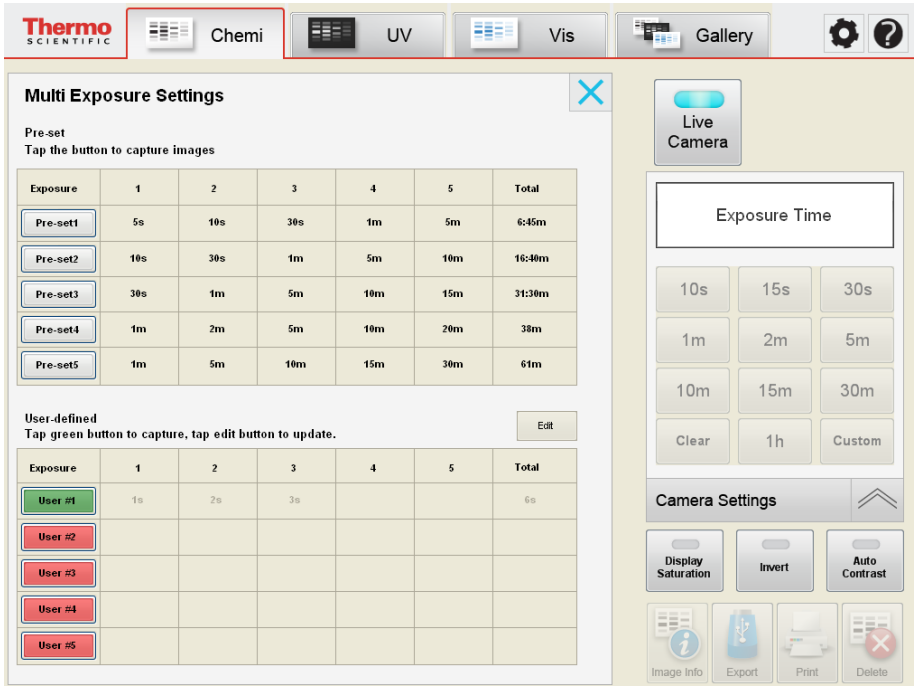
4. Touch the **Acquire** button to capture the image.

5. The image will display in a tab on the touchscreen and be saved to the **Gallery**.

Note A **Stop** button appears over the keypad once the **Acquire** button is touched. Image acquisition can be stopped by touching the **Stop** button.

Note Up to six recent images will be displayed on the touchscreen.

Multiple Image Acquisition



1. Select the **Chemi** icon from the top mode settings tabs.

2. (Optional) Select the **Live Camera** button if the live image is not displayed.

3. The white LED lights and live image display are activated. Open the imager door, pull out the transilluminator and install the chemiluminescence exposure screen (black) on the transilluminator glass.

4. Insert and center the sample on top of the chemiluminescence exposure screen (black) using the live image display for reference.

5. Once the sample is centered, close the imager door.

6. While viewing the live image, adjust the settings for **Focus**, **Digital Zoom** and **Resolution/Sensitivity** in the **Camera Settings** menu, if needed.

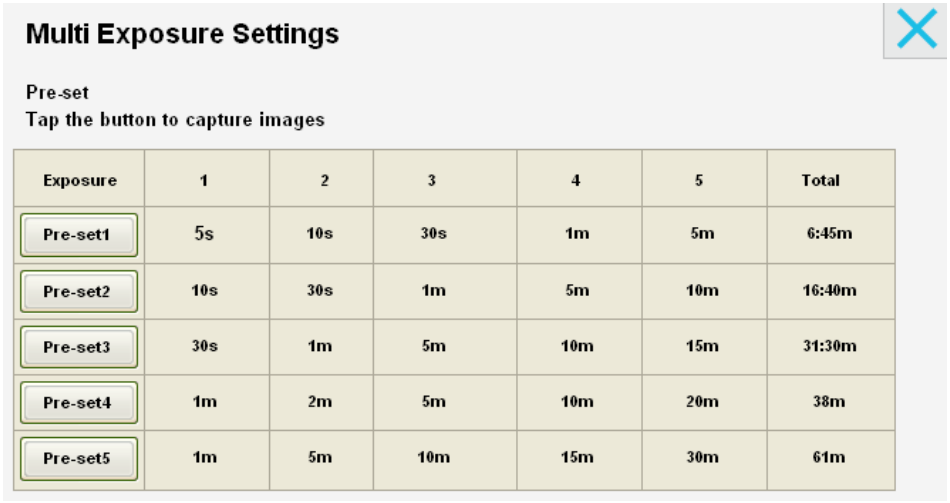
   Note **Camera Settings** are available only with the live image display.

7. Select a **Pre-set** or **User-defined Multiple Exposure Time**.

   Note A **Stop** button appears over the keypad once the **Acquire** button is touched. Image acquisition can be stopped by touching the **Stop** button.

Pre-set Multiple Exposure Settings

The five pre-set exposure settings allow you to select a time series of exposures.

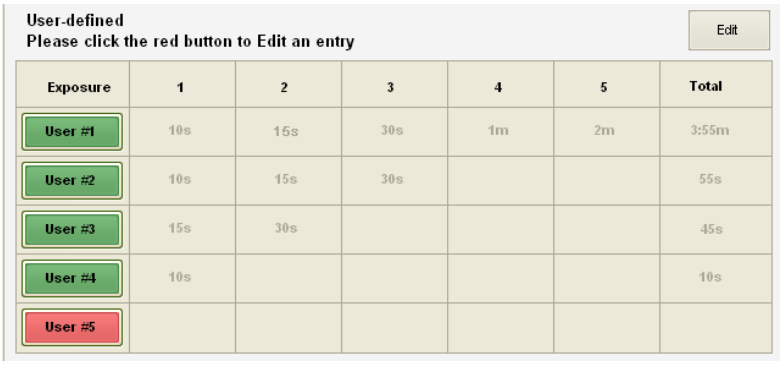


Exposure	1	2	3	4	5	Total
Pre-set1	5s	10s	30s	1m	5m	6:45m
Pre-set2	10s	30s	1m	5m	10m	16:40m
Pre-set3	30s	1m	5m	10m	15m	31:30m
Pre-set4	1m	2m	5m	10m	20m	38m
Pre-set5	1m	5m	10m	15m	30m	61m

1. Select the **Multi** button from the touchscreen number keypad.
2. Select one of the **Pre-set #** option buttons with an appropriate time series of exposures.
3. The images are automatically acquired.
4. Captured images are displayed on the screen and stored in the **Gallery** for further viewing and selection.

User-defined Multiple Exposure Settings

The **User-defined Multiple Exposure** settings allow you to set custom times in situations where the pre-set exposure times do not meet your needs.

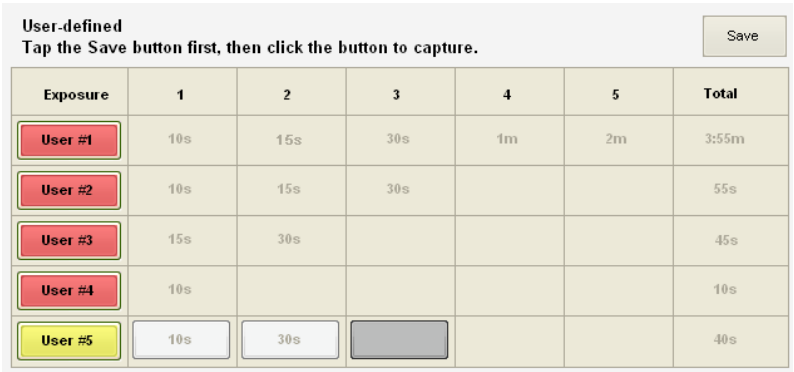


1. Select the **Multi** button from the touchscreen number keypad.

2. To create or edit the user-defined exposure time settings, select the **Edit** button to highlight the five **Exposure** fields.

3. Choose one of the **User #** option buttons to highlight the set of cells for user input.

4. Using the time keypad, input the desired time into each cell. Enter exposure times in ascending or increasing increments with the shortest amount of time in column 1 and the longest amount of time in column 5. The highlighted cell will move to the right as each time is input.



5. The **Total** time is calculated and displayed as each new time is input into a cell.

6. When you are finished entering time, select the **Save** button (former **Edit** button) in the top right corner of the table. This saves the **User #** time settings for further uses. All five **User #** time settings are entered and saved the same way.

7. Touch the **User #** button to automatically capture the images.

8. Captured images are displayed on the touchscreen and stored in the **Gallery** for further viewing and selection.

Image Tools

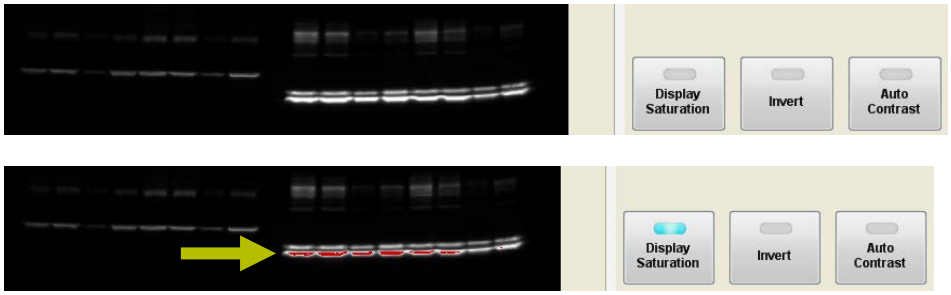
Note The Image Tools only function while viewing or printing the image. **Display Saturation, Invert** and **Auto Contrast** adjustments are NOT saved with the image file.

Display Saturation

In **Chemi** mode, after capturing an image, the **Display Saturation** button can be selected to highlight image areas that are considered to be saturated. A red false-color is superimposed on the areas deemed to be saturated. Adjustment to the saturation can be done by adjusting the exposure time for subsequent images. Shorter exposure times will reduce the light exposure/saturation.

1. After capture of an image, select the **Display Saturation** button under the time keypad.

2. The screen will display the saturated pixels on the image with a red false-color.



If the image appears to be over- or under-saturated, the image exposure time may need to be increased or decreased to acquire a properly saturated image. exposure time can be adjusted before image capture by using the number keypad.

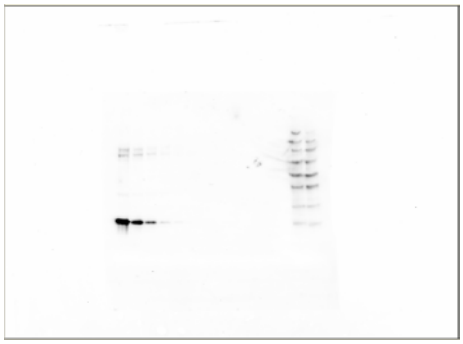
3. The **Display Saturation** button can be selected again to turn off the false-color imaging.

   Note The **Display Saturation** button is disabled when the **Auto Contrast** function is enabled.

Invert Image

The **Invert** button is a useful tool for viewing faint gel bands. This tool inverts the standard black background with white highlights to a white background with black highlights or vice versa.

Original Chemi Image



Inverted Chemi Image

1. In the active live image or acquired image, select the **Invert** button under the time keypad.

2. The inverted image can be used for acquiring images or switched back to the standard image by again selecting the **Invert** button.

Auto Contrast

Selecting the **Auto Contrast** button increases the contrast between the signal and the background to increase visibility.

Image Information

Information for each image is stored in a separate file together with the captured image.

1. With the needed image on the screen, select the **Image Info** icon at the bottom right of the screen.

2. A box appears with all of the relevant image information for that image. Beneath the box is a keyboard for personal data input. Only the fields for **File name, User, Project** and **Notes** can be modified.

3. Upon each image capture, the imager assigns a default name to the image file. This image file name can be altered within the **Image info** screen.

Ultraviolet (UV) Mode

Ultraviolet (UV) mode is used for the capture of images using transmitted UV light.

CAUTION UV mode uses the UV lights in the transilluminator. Long-term exposure to UV light can be harmful. Use the appropriate eye and skin personal protective equipment (PPE) if there is any chance of exposure to the UV light.

Note The transilluminator UV light is initially on for 5 minutes. User input will then be requested for further use of the UV light. If you do not select the "Keep UV on" button after the initial 5 minutes, then the UV light will automatically turn off.

If the UV light is needed after opening the imager door, the **white door peg** can be pulled out to turn on the UV bulbs. **Appropriate PPE must be worn if performing this operation.** The **white door peg** returns to a normal position once the door is fully closed.

Extended "UV on" position

Retracted "UV off" position

Camera Settings

UV mode uses the same functional **Camera Settings** as the **Chemi** mode, but adds the camera setting functions for **Aperture**, **UV Light** and **Filter Wheel Position**.

Capture Settings

Image Acquisition

1. Select the **UV** tab on the touchscreen.
2. (Optional) Enable the **UV** button and select the **Live Camera** button if the live image is not displayed.
3. Open the imager door and confirm that the UV light is off. The white LED lights are activated once the door is opened. Pull out the transilluminator and place the UV exposure screen (clear) on top of the transilluminator.

4. Insert and center the sample on top of the UV exposure screen (clear) using the live image display for reference. Once the sample is centered, close the imager door.
5. While viewing the live image, adjust the necessary settings for **Focus**, **Digital Zoom, Sensitivity/Resolution** and **Aperture** to produce the desired image.

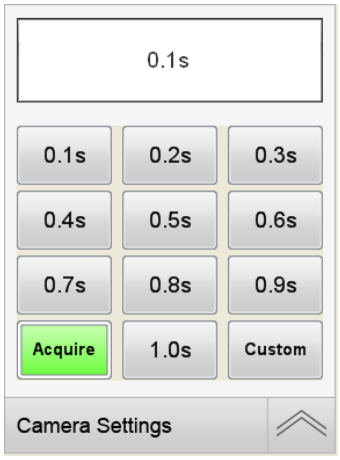
   Note Camera Settings are only available with the live image display.

Pre-set Exposure Time

1. (Optional) Select the **Live Camera** button if the live image is not displayed.

2. Select one of the pre-set exposure time buttons using the touchscreen keypad.

3. The live image with the new exposure time will be displayed. If needed, modify the exposure time using the pre-set exposure time buttons.



4. Select the **Acquire** button to acquire an image.

5. Captured images are displayed on the screen and automatically stored in the **Gallery** for further viewing and selection.

Custom Exposure Time

1. Select the **Custom** exposure button using the touchscreen keypad.

2. Enter the desired time in milliseconds (ms), seconds (s) or minutes (m) using the touchscreen keypad numbers. The **m : s** box is used to input seconds and/or minutes and is active by default (box is gray in color). For a custom exposure time of <1 second, select the **ms** box to input milliseconds. The shortest exposure time that can be entered is 10 milliseconds; this appears as "10" in the **ms** box.

   Note The live image will NOT display the new **Custom** exposure time.

3. Select the **Acquire** button to acquire an image.

4. Captured images are displayed on the screen and automatically stored in the **Gallery** for further viewing and selection.

Stop Image Acquisition

Upon touching the **Acquire** button, a **Stop** window appears over the keypad. Selecting the **Stop** button will stop the current image acquisition exposure and return the screen to the current session exposure settings.

Image Tools

Note The Image Tools only function while viewing or printing the image. **Display Saturation, Invert** and **Auto Contrast** adjustments are NOT saved with the image file.

Display Saturation

In **UV** mode, while viewing the live image or after capturing an image, the **Display Saturation** button can be selected to highlight the image pixels that are considered to be saturated. A red false-color is superimposed on the pixels deemed to be saturated. Adjustment to the saturation can be done by adjusting the **Aperture** and/or exposure time for subsequent images. Shorter exposure times will reduce the light exposure/saturation.

1. While viewing the live image display, select the **Display Saturation** button under the time keypad.

2. The screen will display the saturated areas of the image with a red false-color.

3. While viewing the live image display, in **Camera Settings**, use the **Aperture** slider bar to adjust the saturation by opening (moving slider to left) or closing (moving slider to right) the aperture. Opening the aperture will increase image brightness and saturation. Closing the aperture will decrease image brightness and saturation.

4. If required, the image exposure time may need to be increased or decreased to acquire a properly saturated image. Exposure time can be adjusted before image capture by using the number keypad.

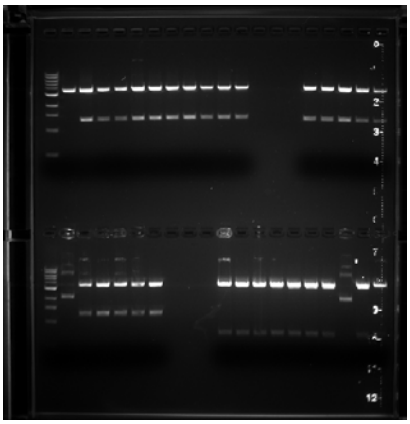
5. Select the **Display Saturation** button again to turn off the false-color imaging.

   Note The **Display Saturation** button is disabled when the **Auto Contrast** function is enabled.

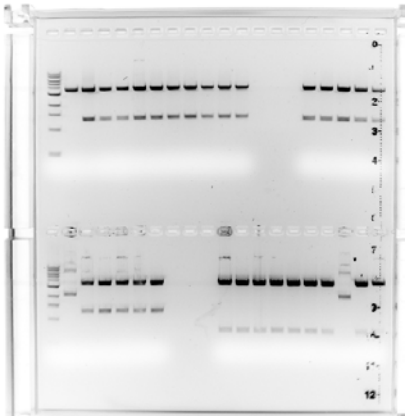
6. Proceed with the steps for acquiring an image.

Invert Image

The **Invert** button is a useful tool for viewing faint gel bands. This tool inverts the standard black background with white highlights to a white background with black highlights.



Original UV Image



Inverted UV Image

1. In the active live image, select the **Invert** button from under the time keypad.

2. The inverted image can be switched back to the standard image by again selecting the **Invert** button.

Auto Contrast

Selecting the **Auto Contrast** button increases the contrast between the signal and the background to increase visibility. This adjustment can be used only for touchscreen viewing or printing of the image. The contrast adjustment is not saved with the image file.

Visible (Vis) Mode

Visible (Vis) mode is used for the capture of gel images using reflected and/or transmitted light.

CAUTION Vis mode uses the UV lights from the transilluminator. Long-term exposure to UV light can be harmful. Use the appropriate eye and skin PPE if there is any chance of exposure to the UV light.

Note The transilluminator UV light is initially on for 5 minutes. User input will then be requested for further use of the UV light. If you do not select the "Keep UV on" button after the initial 5 minutes, then the UV light will automatically turn off.

Camera Settings

Vis mode uses the same functional camera settings as the UV mode.

Image Acquisition – Transmitted Light

1. Select the Vis tab on the touchscreen. Changing to Vis mode automatically turns on the UV lights within the transilluminator and the LEDs.
2. (Optional) Select the Live Camera button and enable the UV button if the live image is not displayed and the transmitted light is off.
3. Open the imager door, confirm the UV light is off, pull out the transilluminator and install the white light conversion screen on top of the transilluminator.
4. Insert and center the sample on top of the white light conversion screen using the live image display for reference.
5. Once the sample is centered, close the imager door. The UV lights will turn on and show as visible light transmitting through the white light conversion screen.
6. While viewing the live image, adjust the necessary settings for Focus, Digital Zoom, Sensitivity/Resolution and Aperture to produce the desired image.
7. Select a Pre-set or Custom exposure time.

Image Acquisition – Reflected Light

1. Select the Vis tab on the touchscreen. Changing to Vis mode automatically turns on the UV lights within the transilluminator and the LEDs.
2. (Optional) Select the Live Camera button and enable the UV button if the live image is not displayed.

3. Open the imager door, confirm that the UV lights are off, and install the white light conversion screen on top of the transilluminator glass.

4. Insert and center the sample on top of the white light conversion screen using the live image display for reference.

5. Once the sample is centered, close the imager door. The UV lights will turn on.

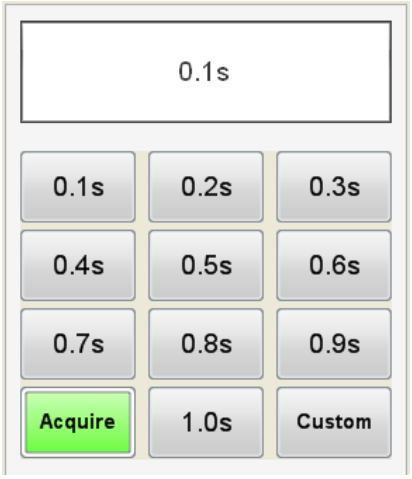
6. Select the **UV** light button on the right side of the screen to switch **OFF** the UV lights. This produces only reflected light.

7. While viewing the live image display, adjust the camera settings for **Focus**, **Digital Zoom**, **Resolution/Sensitivity** and **Aperture** to produce the desired image, if needed.

8. Select a **Pre-set** or **Custom** exposure time.

Pre-set Exposure Time

1. Select one of the **Pre-set** exposure time buttons using the keypad.



2. Select the **Acquire** button to capture an image.

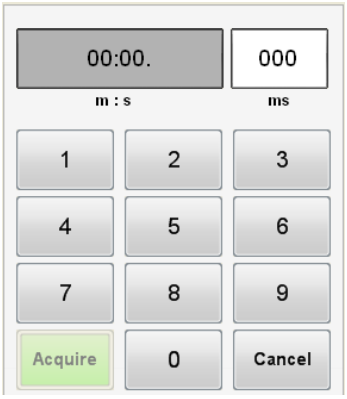
3. Captured images are displayed on the screen and automatically stored in the **Gallery** for further viewing and selection.

   Note A **Stop** button appears over the keypad once the **Acquire** button is touched. Image acquisition can be stopped by touching the **Stop** button.

Custom Exposure Time

1. Select the **Custom** exposure button using the keypad.

2. Enter the desired time using the keypad numbers. The **m : s** box is used to input seconds and/or minutes and is active by default (box is gray in color). For a custom exposure time of <1 second, select the **ms** box to input milliseconds. The shortest exposure time that can be entered is 10 milliseconds; this appears as "10" in the **ms** box.



3. Once a value is entered into the **Custom** time field, the **Acquire** button will become active. Select the **Acquire** button to capture an image.

4. Captured images are displayed on the screen and automatically stored in the **Gallery** for further viewing and selection.

   Note A **Stop** button appears over the keypad once the **Acquire** button is touched. Image acquisition can be stopped by touching the **Stop** button.

Image Tools

Note The Image Tools only function while viewing or printing the image. **Display Saturation, Invert** and **Auto Contrast** adjustments are NOT saved with the image file.

Display Saturation

In **Vis** mode, while viewing the live image or after capturing an image, the **Display Saturation** button can be selected to highlight live and captured pixels that are considered to be saturated. A red false-color is superimposed on the pixels deemed to be saturated. Adjustment to the saturation can be done by adjusting the **Aperture** and/or exposure time for subsequent images. Shorter exposure times will reduce the light exposure/saturation.

1. While viewing the live image display, select the **Display Saturation** button under the time keypad.

2. The screen will display the saturated areas of the image with a red false-color.

3. Using the **Aperture** slider bar in **Camera Settings**, adjust the saturation by opening (moving slider to left) or closing (moving slider to right) the aperture. Opening the aperture will increase image brightness and saturation. Closing the aperture will decrease image brightness and saturation.

4. If required, the image exposure time may need to be increased or decreased to acquire a properly saturated image. Exposure time can be adjusted before image capture by using the number keypad.

5. Select the **Display Saturation** button again to turn off the false-color imaging.

   Note The **Display Saturation** button is disabled when the **Auto Contrast** function is enabled.

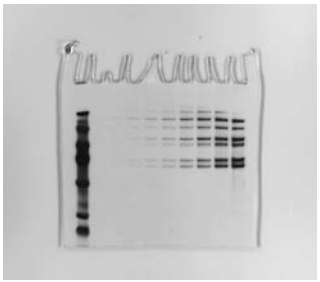
6. Proceed with the steps for acquiring an image.

Invert Image

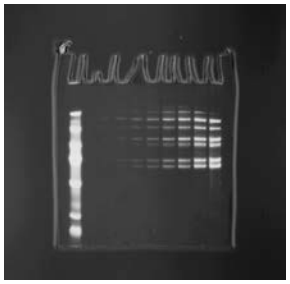
The **Invert** button is a useful tool for viewing faint gel bands. This tool inverts the standard black background with white highlights to a white background with black highlights.

1. In the active live image, select the **Invert** button under the time keypad.

2. The inverted image can be used for acquiring images or switched back to the standard image by again selecting the **Invert** button.



Original Vis Image



Inverted Vis Image

Auto Contrast

Selecting the **Auto Contrast** button increases the contrast between most bands and the background to increase visibility. This adjustment can be used only for touchscreen viewing or printing of the image. The contrast adjustment is not saved with the image file.

File Management

Image file management includes editing image info, exporting, printing and deleting files. All image files and image information are saved and exported in individual folders. These folders contain both the .xml file with the image information and the .tiff file containing the image.

Image Info

Image Info can be selected for any captured image. This lists the acquisition information for the highlighted image.

Export

You can select **Export** and save highlighted images to a USB flash drive available through connection to a USB port.

Note Users may need to momentarily wait for the imager to detect the external drive once it is connected to the USB port for the first time.

Print

The **Print** button allows the highlighted image to be printed to a selected external printer. A **Print Preview** window will appear before printing begins.

Delete

Delete allows you to permanently delete the highlighted image.

Image Information

Information for each captured image is stored in a separate file (*image file name.xml*) together with the captured image.

1. With the captured image on the screen, select the **Image Info** icon at the bottom right of the screen.

2. A box appears with all of the relevant image information for that image. Beneath the box is a keyboard for inputting personal data into the open fields. Only the fields for **File name, User, Project** and **Notes** can be modified.

3. After the capture of each image, the imager assigns a default name to the image file. This image file name can be altered within the **Acquisition Information** screen.

File name Image title **(Imager generated or user-defined)**

User Person using the MYECL Imager **(User-defined)**

Project Name of project **(User-defined)**

Notes Relevant notes pertaining to image or experiment **(User-defined)**

Exposure time Chosen exposure time for image

Mode Single or multi

Acquisition time Time of day image was taken

Acquisition date Date image was taken

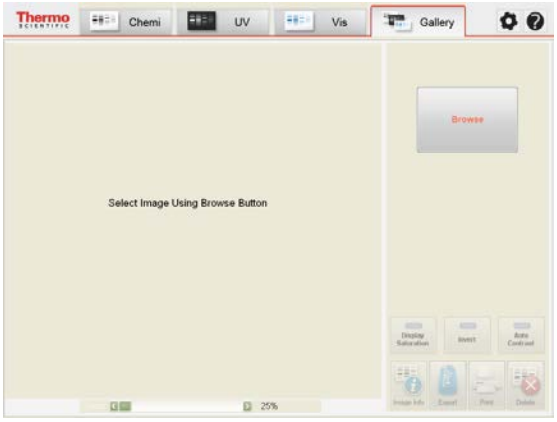
Sensitivity/Resolution setting Binning used for image acquisition

Image Gallery

The image gallery allows you to view and open multiple previously captured images at one time.

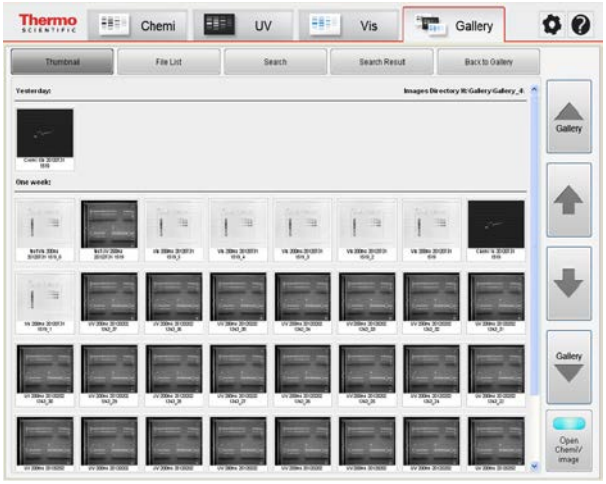
Image Viewing

1. Select the **Gallery** tab at the top of the touchscreen.
2. Click on the **Browse** button to open the gallery.



Thumbnail

3. **Thumbnail** will display previously taken images. Images are separated into sections of days, weeks, months and years. You can use the two right middle arrow buttons or the vertical scrollbar to move and view between the sections. If the current gallery contains images from more than 40 image acquisitions, the profram will automatically create and move to a new gallery. Other galleries can be accessed using the right **Gallery** arrow buttons.



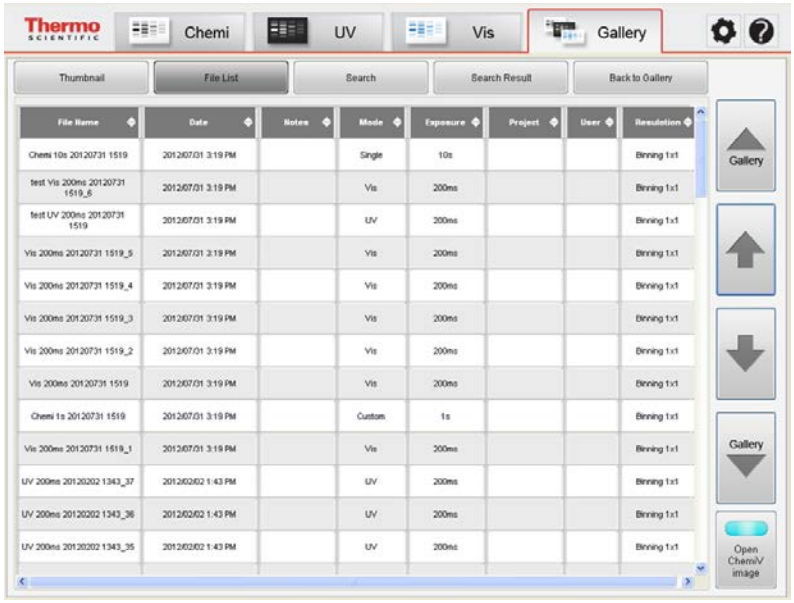
4. Choose an image or series of images by touching the images on the touchscreen.

   Note Before selecting an image, you can choose to view only the Chemi image or both the Chemi and ChemiV images of the same sample by selecting the **Open ChemiV Image** button at the bottom right of the **Gallery** screen. This function is useful for establishing band locations in a Chemi image against known protein weight markers in a ChemiV image.

   Note Selecting one ChemiM image will open all of the images associated with that specific multiple exposure. Up to six images, including ChemiV images, can be selected and displayed at one time.

File List

The **File List** tab displays image information in a list format for ease of searching and sorting. The list is sortable in eight different fields by selecting the appropriate column heading: **File Name, Date, Notes, Mode, Exposure, Project, User** and **Resolution**.



Search

The **Search** tab allows you to search through the full gallery. Images can be searched by **File Name, Date, Notes, Project** or **User** by entering the needed information using the attached keyboard. The search results are displayed in the Search Result window; the results listings are sortable by field.

Chapter 4 Maintenance

Cleaning the Imager and Sample Screens

IMPORTANT When using any cleaning products with the imager, consult the appropriate material safety data sheet (MSDS) to confirm compatibility with the imager and proper usage of the cleaning product.

Spray a soft cloth or paper towel with cleaning solution (e.g., general purpose cleaner, isopropanol or 70% ethanol). Wipe the surface of the transilluminator, the sample screens and the imager's exterior housing.

LCD Touchscreen

Cleaning the Touchscreen

Use a pre-moistened LCD screen cleaning tissue to clean the surface of the touchscreen.

IMPORTANT Use of ammonia-based cleaners to clean the touchscreen is NOT recommended. Do not spray cleaner directly onto the LCD screen.

IMPORTANT Do not press hard while cleaning the screen. Do not leave excess cleaning solution on the LCD screen as this may cause long-term damage.

Use of the Stylus

The stylus is recommended for interacting with the touchscreen. Use the tip of the stylus to lightly tap the touchscreen for selection of menus, icons, and buttons.

Note Fingertips can be used for interaction with the touchscreen; however, the stylus is easier to use with gloved hands and prevents fingerprints on the screen.

UV Transilluminator

CAUTION The UV transilluminator contains UV bulbs. Long-term exposure to UV light can be harmful. Use the appropriate eye and skin personal protective equipment (PPE) if there is any chance of exposure to the UV light.

Band Excision

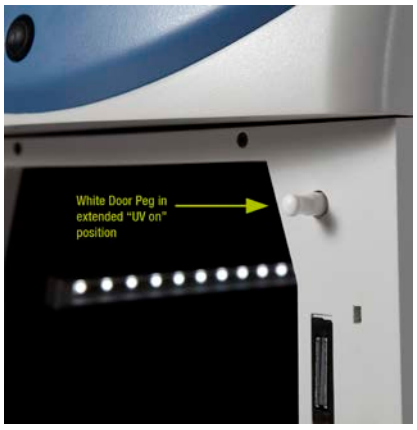
1. Wearing UV-protective eyewear and clothing, open the imager door and slide out the transilluminator.

2. Place the UV exposure screen (clear) on the transilluminator and place the gel sample on top of the screen.

   IMPORTANT Use of the UV exposure screen (clear) protects the transilluminator from nicks and scratches as a result of excision.

3. In UV mode, select the UV button for the UV light. A message will appear asking if you want to turn on the UV light with the door open. Select Yes.

4. The software then displays a reminder message requiring the appropriate PPE and asks the user to pull out the white door peg.



Extended "UV on" position

Retracted "UV off" position

5. Excise the appropriate bands from the gel sample.

Note As a safety precaution, the UV light automatically turns off after five minutes. With 30 seconds remaining, a message will appear on the touchscreen indicating that the UV light will be turned off unless the "Keep UV on" button is selected.

6. When finished, turn off the UV light by pushing in the **white door peg**. Push the transilluminator back into the imager. Alternatively, push the transilluminator back into the imager and close the door, which automatically pushes the **white door peg** back into place.

Cleaning the Transilluminator

Ensure the transilluminator surface is cool. Saturate a clean soft cloth or paper towel with cleaning solution (e.g., general purpose cleaner, isopropanol or 70% ethanol). Wipe the surface of the transilluminator.

Replacement of Transilluminator Bulbs

Note To ensure uniform illumination, replace all six UV transilluminator bulbs, even if only one bulb fails.

1. Shut down the imager and unplug the power cord.
2. Open the imager door and completely slide out the transilluminator. Ensure the transilluminator is cool to touch.
3. Remove the four thumbscrews on the transilluminator coverplate.
4. Lift the coverplate to expose the bulbs. Use caution to avoid damaging the electrical cord.
5. Remove the transilluminator bulbs by rotating ~90° counterclockwise until the pins align with the bulb socket. A click will be heard when the bulb pins are aligned. Lift the bulb up and out of the socket.
6. Insert the new transilluminator bulbs by sliding pins into the bulb socket and rotating ~90° clockwise. A click will be heard when the bulb pins are set.
7. Repeat Steps 5 and 6 for the remaining five bulbs.
8. Replace all necessary components of the transilluminator and avoid damaging the electrical cord. Replace and hand tighten the four thumbscrews.
9. Push the transilluminator back into the imager.
10. Plug the imager power cord back in and turn the system power on.

Emission Filters

A variety of emission filters can be used in the imager. The appropriate filter choice is dependent on the emission wavelength of the sample. Consult Table 2-4 in Chapter 2 to confirm your filter choice.

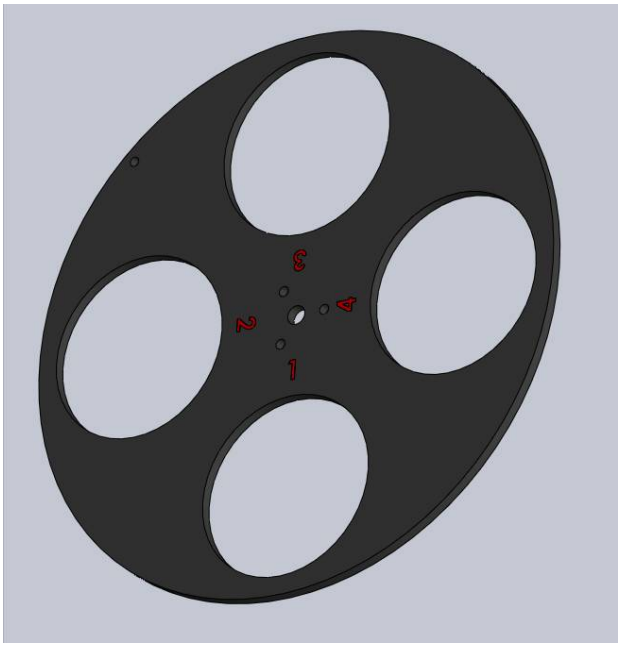
Changing Filters

The filter wheel allows for easy installation and removal by using threaded filters. The filters are fragile, so use caution when handling and installing or removing.

IMPORTANT When installing filters, ensure that the filter threads are correctly aligned with the filter wheel threads. **Forcing a filter to screw in will result in cross threading and damage to the filter wheel.**

1. Turn off the system power.
2. Open the imager door and locate the filter wheel at the rear of the cabinet. Each filter position is labeled with a red position number.

   Position 1 Permanently empty for chemiluminescent imaging
   Position 2 Orange filter (default filter supplied with the imager)
   Position 3 Open for additional filter
   Position 4 Open for additional filter



3. To install an emission filter, insert the threaded side of the filter into an open port on the filter wheel. Turn clockwise to screw the filter in place until hand tight.

4. To remove an emission filter, grasp the outer edge of the filter housing and turn counterclockwise to unscrew and remove.

5. When filter installation/removal is complete, turn the system power on.

6. Update the filter settings in the **Tools** menu. See Chapter 2: Imager for directions on changing the filter settings.

Appendix A
Technical Specifications

Imager Parameter	Specification
Power Maximum	120W
Frequency Range	50-60Hz
AC Voltage	100-240V
Current	1.2A maximum (dependent on supply voltage)
Fuse	T4AL, 250V, 4A fuse
Dimensions	21 inches H × 12.25 inches W × 22 inches D (53.3cm H × 31.1cm W × 55.9cm D)
Weight	65lbs (29.5kg)
Wavelength Range	Specific wavelengths between 370-700nm
Camera	High-resolution, thermoelectrically regulated at -25°C, 4.2MP digital camera with 16-bit dynamic range
Lens	50mm, f/0.95 aperture
Filter Wheel	4 position, motorized
Touchscreen	10.4 Inch LCD screen
Light Source	306nm trans-UV, epi-white
Manufacturer	Thermo Fisher Scientific 3747 N Meridian Rd Rockford IL 61105-0117 USA

Appendix B
Accessories

Product No.	Product Name	Package Size
62237†	MYImageAnalysis Software	1 CD
62238†	Orange Filter	1 filter
62239	Green Filter	1 filter
62240	Red Filter	1 filter
62241	Blue Filter	1 filter
62242†	Chemiluminescence Exposure Screen	1 screen
62243†	White Light Conversion Screen	1 screen
62244†	UV Exposure Screen	1 screen
62255	Transilluminator Bulb, 365nm	1 bulb
62258†	Transilluminator Bulb, 306nm	1 bulb
62261†	Touchscreen Stylus and Holder	1 package
62267†	Imaging Reference Target	1 package
EW84857	One Year Extended Warranty	
84858†	Power Cord/C13 Connector, North America	1 cord
84859†	Power Cord/C13 Connector, Continental Europe	1 cord
84860†	Power Cord/C13 Connector, United Kingdom/Ireland	1 cord

† Replacement part for accessory supplied with the MYECL Imager.

Appendix C
Related Thermo Scientific Products

Product No.	Product Name
34087	SuperSignal* West Pico Chemiluminescent Substrate
34075	SuperSignal West Dura Extended Duration Substrate
34095	SuperSignal West Femto Maximum Sensitivity Substrate
46640	SuperSignal Western Blot Enhancer
32209	Pierce* ECL Western Blotting Substrate
32132	Pierce ECL Plus Western Blotting Substrate
24615	Imperial Protein Stain, 1L
88518	PVDF Transfer Membrane, 0.45µm, 26.5cm × 3.75m
88018	Nitrocellulose Membrane, 0.45µm, 30cm × 3.5m
88610	Western Blotting Filter Paper, extra thick, 8.5cm × 9cm
26616	PageRuler* Prestained Protein Ladder, 10-170kDa, 2 × 250µL
26619	PageRuler Plus Prestained Protein Ladder, 10-250kDa, 2 × 250µL
26614	PageRuler Unstained Protein Ladder, 10-200kDa, 2 × 250µL
26634	Spectra* Multicolor Broad Range Protein Ladder, 10-260kDa, 2 × 250µL
26625	Spectra Multicolor High Range Protein Ladder, 40-300kDa, 2 × 250µL
26628	Spectra Multicolor Low Range Protein Ladder, 1.7-40kDa, 250µL
26612	Pierce Prestained Protein Molecular Weight Marker

Glossary

Aperture Adjustable lens opening controlling the sensitivity and depth of field

Camera CCD video camera used to capture moving and still images

Chemiluminescence (Chemi) mode Captures images of sample-emitted light

Default Standard or home value for a setting

Emission filter Optical lens mounted in the Filter Wheel; used for filtering specific wavelengths of light

Filter Wheel Automated wheel holding filters in front of camera lens

Gallery Visible holding area for captured images

Hard (Main) Power Switch Main power rocker switch located on the rear imager panel

Lens Camera lens mounted to the CCD camera

Plug-and-play External computer accessories only requiring connection to the computer for operation

Resolution The number of camera pixels used to capture an image

Sample screens The clear, black and white panels placed over the transilluminator during image acquisition

Sensitivity CCD camera's degree of response to light

Soft Power Switch Blue-lit round button located on the front imager panel

Stylus Pen-shaped device used to input commands on the touchscreen

Transilluminator Sliding sample work platform containing the UV bulbs

Ultraviolet (UV) mode Captures images using transmitted ultraviolet light

Visible (Vis) mode Captures images using reflected visible light or transmitted light

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